

# THE NATURAL HISTORY OF NAMOLUK ATOLL, EASTERN CAROLINE ISLANDS

by Mac Marshall<sup>1/</sup>

## INTRODUCTION

As of 1969, the scientific community had no general information on the natural history of Namoluk Atoll in the Eastern Caroline Islands of Micronesia. The only significant published source for the atoll was an ethnographic and linguistic account provided by the German physician, Max Girschner (1912, 1913), that contained a few brief passages on the biology and physical environment of the atoll. With this lack of basic descriptive environmental information in mind, I resolved to make observations and collections of specimens of use to other atoll scholars ancillary to an anthropological research project which I undertook on Namoluk from 1969-1971.<sup>2/</sup> This paper is designed to fill some of the

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<sup>2/</sup> Field research in cultural anthropology was conducted on Namoluk Atoll and with Namoluk persons on Moen Island, Truk, for a period of eighteen months during 1969-1971 supported by the National Institute of Mental Health (MH 11871-01 and MH 42666-01), and the Department of Anthropology, University of Washington. Funds for gathering botanical data were made available from the Bernice Pauahi Bishop Museum and the University of Hawaii (NIH Grant No. GM-15198) through the kind assistance of Douglas Yen. Preparation of this manuscript was facilitated by an Old Gold Summer Faculty Research Fellowship from the Graduate College, University of Iowa. I am greatly indebted to these sources of financial support. I would also like to express my appreciation to Sarel R. Agrippa for maintaining the meteorological observations in my absence from June to December 1970, to Sapuro I. Kouch, Kichi Lippwe and Kino S. Ruben for assistance in gathering and preparing the plant collections, to F. R. Fosberg for material assistance and encouragement, and to John Tandarich for technical help in preparation of the photographs for publication. During the period of research the de facto population of Namoluk Atoll fluctuated between 250 and 300 persons, depending upon how many happened to be away in the port town on Moen Island, Truk, or elsewhere at a given moment. The most recent census figures available from the Trust Territory indicate that this number has remained stable through 18 September 1973 (U.S. Trust Territory of the Pacific Islands 1974), with 263 persons reported on Namoluk Atoll at census time. The total living population of 'Namoluk citizens' regardless of location numbered 416 on 1 January 1973. At present, the entire human population of the atoll resides on Namoluk Islet; Amwes Islet, which formerly supported a separate community, has not been permanently inhabited since its populace was decimated by an epidemic in the late 1930s. The reader interested in further details on Namoluk demography is referred to an extended treatment of this subject (Marshall 1975).

gaps in our knowledge of the natural history of Namoluk by summarizing and reporting the information so gathered through August 1971. With the exception of a brief note on avifauna (Marshall 1971), these are the first systematic environmental data to be presented for the atoll.

Until archaeological investigations are undertaken, the prehistory of Namoluk must remain conjectural. Although we lack any reliable estimate of the time depth of human habitation on the atoll, we are fortunate to have a few ethnohistorical records that offer some sense of the atoll's early contact with the West.

The first Westerner to sight Namoluk was an American whaling captain, Richard Macy, aboard the Harvest in 1827 (Day 1966:171; Sharp 1960:217). Less than a year later in 1828, a Russian scientific expedition under the command of Fedor Lütke visited Namoluk. Although Namoluk men boarded Lütke's ship to trade, none of the ship's company put ashore (Lütke 1835:88-91).

Only scattered records exist of vessels sighting or calling at Namoluk during the 1830s and 1840s. Benjamin Morrell, captain of the ship Antarctic out of Stonington, Connecticut, passed close by Namoluk in 1830, evidently without landing (Morrell 1832:388-389). Three years later an American whaler, the Hashmy under Captain Harwood, called at Namoluk, and an extract from the Hashmy's log recounts what is believed to be the first arrival of Westerners on the atoll (Ward 1967:3-4).

By the 1840s traders began venturing into the Eastern Carolines, although relatively few historical documents seem to have survived this era. The bark Zotoff out of Salem, Massachusetts, skippered by a trader named Captain Wallis, sailed past Namoluk without heaving to on 7 June 1846 while en route from Manila to Fiji (Wallis 1851:195). In July of the same year the trader Andrew Cheyne called at Namoluk aboard the Naiad, and he commented that the islets were "covered with cocoa-nuts and bread-fruit trees" (Cheyne 1852:129).

From the 1840s there follows a thirty year hiatus for which no known historical materials pertaining to Namoluk have been found. In rapid succession during the 1870s and early 1880s, however, Protestant missionaries and resident traders came to Namoluk. The Reverend E. T. Doane stopped briefly at Namoluk in 1874 aboard the mission vessel Star (Doane 1874:204), and on 1 December 1879 a young Ponapean missionary couple took up residence on the atoll (Missionary Herald 1880:175). The British trading schooner Rupak did not land a party when she reached Namoluk on 19 April 1875 because she could locate no pass through the reef (Robertson 1877:51-52), but despite the hazards of Namoluk's barrier reef, a young American trader, George Barrows, settled briefly on the atoll in 1880, and he was succeeded shortly thereafter by a Dutch trader named "Jacob" in 1881 (Westwood 1905:119, 131). Unfortunately, we lack records for many of the ships that must have called at Namoluk during this period, although we do know that the Henderson and MacFarlane trading vessel Belle Brandon, Captain Harris, visited the atoll in early 1880 (Dana 1935:100). From this time on,

Namoluk's contact with the outside world increased steadily, and contact has been more or less continuous under the German, Japanese, and American colonial administrations.

#### PHYSICAL DESCRIPTION

Namoluk is a small, triangular-shaped coral atoll located at 5° 55' north latitude and 153° 08' east longitude, approximately 200 kilometers southeast of Truk in the Eastern Caroline Islands. Namoluk's nearest neighbors are Etal Atoll, lying some 56 kilometers to the southeast, and Losap Atoll situated 105 kilometers to the northwest.

Roughly 1.5 kilometers on each side, Namoluk's reefs completely encircle a lagoon of about 7.5 square kilometers. Reference to plate 1 shows that the atoll is divided into five islets: Namoluk, Lukan, Töinom, Umap, and Amwes (also spelled Amas). The total land area of these five islets is .834 square kilometers or around 83 hectares, and is distributed as follows: Namoluk (31 hectares), Amwes (28 hectares), Töinom (21 hectares), Lukan (1.5 hectares), and Umap (1.5 hectares).

It is of geological interest to note that Lütke (1835) circumnavigated the atoll early in 1828 and reported only four islets. Given the reliability accorded Lütke's observations by historians, it seems unlikely that this number is in error. Less than twenty years later, another reliable observer of the Pacific scene visited Namoluk and mentioned that the atoll consisted of five islets (Cheyne 1852:129). On the basis of this evidence, it seems probable that Umap and Töinom Islets separated into two distinct landforms sometime between 1828 and 1846. Perhaps the sea broke through during a severe typhoon of which we have no record (see plate 2).

Namoluk's lagoon, which drops to a depth of 42 fathoms at its center, is among the deepest in the Pacific, and the ocean waters surrounding the atoll reach depths well over 400 fathoms only 1.5 kilometers offshore.

Sometime between June 1944, when the U.S. Navy made an aerial photomosaic of Namoluk (plate 1), and October 1969, when the research reported here began, an "unnamed" sixth islet to which Bryan (1971) makes reference merged with Töinom and now forms the northwest tip of that islet. Actually, this piece of land (named Chä) was never a separate islet at all, but rather a sandbar covered with scrub vegetation (especially *Pemphis acidula*), and connected to the northwest end of Töinom. At high tide this sandbar was separated from Töinom by a shallow channel of water; at low tide it was joined to Töinom, and a small salt-water pool formed between them. Informants recall this pool as an effective natural fish trap.

## REEFS AND CURRENTS

Contrary to the map of Namoluk Atoll presented in Bryan (1971), which is reproduced from U.S. Hydrographic Office Chart 5425, taken in turn from a Japanese sketch survey done in 1924, there is no boat passage or break in the reef as shown between Amwes and Namoluk Islets. There are several natural surge channels through which outrigger canoes can make their way (often with difficulty), and one of these -- located near Namoluk Islet on the southwest side -- has been artificially deepened by blasting to permit outboard motorboats to pass at high tide. This channel was first widened and deepened by blasting as part of a governmental reconstruction program on Namoluk following Typhoon Phyllis in 1958; additional work was carried out in 1973. Even so, passage through this channel requires a tortuous one-quarter mile trip from the beach to open sea.

During the research period, three bottles containing messages were found on the northeast side of Töinom Islet (which is the direction from which the prevailing tradewinds blow). The information on these notes may be of interest to students of Pacific currents, and the relevant data are summarized below (see table 1).

## METEOROLOGY

A daily weather log was maintained on Namoluk for a nineteen month period from 1 January 1970 to 31 July 1971. A minimum-maximum thermometer and a rain gauge were read and reset every twenty-four hours at 6:30 A.M., and the resulting data are presented in table 2.

Namoluk is on the eastern edge of the typhoon belt in the western Pacific, and as such the atoll is visited by destructive storms only infrequently. The typhoon of 27 March 1907 that devastated the Lower Mortlock Islands, causing over 200 deaths there, did not strike Namoluk severely (Anonymous 1907:864), although older informants recall that heavy seas washed inland on Amwes Islet. Likewise, it does not appear that the typhoon of early December 1935 did much damage to Namoluk (U.S. Navy 1944:6). On 24 and 25 May 1958, however, Typhoon Phyllis, packing winds over 100 miles per hour, passed just north of Namoluk causing extensive damage. In brief, physical destruction was as follows:

Practically 75% of all trees were completely uprooted. The remaining 25% were mere stumps sticking 15 or 20 feet into the air. The damage to homes and community buildings was complete. Fortunately only one person was lost during the storm. Destruction of the islands' canoes was complete (Davis 1959a:13).

In the aftermath of Phyllis, almost 100 percent subsistence was given Namoluk people by the Trust Territory government in the form of rice,

flour, and C-rations for well over a year. A gardening and coconut replanting program was begun on the atoll, and materials were provided by the government to rebuild homes and community buildings. Before the typhoon a few breadfruit trees grew on Lukan and Umap Islets; since 1958 there have been none. Before the typhoon more than 100 pigs roamed and rooted about on Amwes Islet; since 1958 the pig population on the atoll has not exceeded forty animals. It is small wonder that Typhoon Phyllis has become an indelible time marker for Namoluk people.

In February 1970 and April 1971, tropical storms Nancy and Amy blew over Namoluk causing some damage to plants. Amy later grew into a typhoon and caused over four million dollars worth of damage on Truk proper and on the atolls to the north of Truk. Most recently, a tsunami hit Namoluk on 17 January 1972, sweeping inland to the taro swamp and doing considerable harm to taro and other plants not tolerant of salt water (Agrippa 1972).

#### NON-AVIAN TERRESTRIAL VERTEBRATES

In a brief discussion of Namoluk's fauna, Girschner (1912:126) wrote:

There are also few animal species. Mammals; the flying dog, rat, cat, pig (now extinct because of the damage it did to plants) and the domestic dog, which was also gotten rid of fairly recently because of its biting habits ... Reptiles; four kinds of lizard and occasionally (sea) turtles (the soup and carret varieties) (translation by Diana Maughan).

To a large degree this list remains descriptive of Namoluk's nonavian terrestrial fauna today.

Mammals presently found on the atoll include the "flying fox" or fruit bat (pwā) (Girschner's "flying dog"), the cat (katu), the pig (pik), two species of rat (maniwel), and as of 1972, the dog (kolek). Of these mammals, only the fruit bat (*Pteropus* sp.) occurs on all of the islets.

Dogs were not kept on Namoluk from 1963 to 1972 because of their uncleanliness and the trouble they caused among people. Correspondence with persons on the atoll reveals that dogs were reintroduced from Etal Atoll and Truk during 1972. Judging from Girschner's comment (1912:126), the keeping of dogs has been a cyclic phenomenon on Namoluk; a similar cyclical pattern for keeping dogs has been reported to me by Vern Carroll for Nukuoro Atoll.

The cat population of approximately fifty animals is concentrated heavily on Namoluk Islet; based on observations and informants' statements, fewer than twenty semi-feral cats are presumed to live on Tbinom and Amwes, and Lukan and Umap have no cats. In February 1971 there were twenty-seven pigs on the atoll--all on Namoluk Islet where they

are kept penned or tethered. Rats occur in great abundance on the three largest islets, and it is common to observe them scurrying about in broad daylight. Trapping efforts in 1971 give credence to local stories claiming Lukan Islet to be rat-free. Detailed observations on man-animal interaction, and the trapping of more than 650 rats were accomplished as part of a seroepidemiologic study of toxoplasmosis carried out in 1970 and 1971 (Marshall 1972; Wallace, Marshall and Marshall 1972), and no rats were captured on Lukan Islet although consistently high catches were made everywhere else the traps were set. Rats do occur on Umap Islet, but interestingly all sixty-three of those trapped there during five days of trapping were Rattus rattus. This datum is striking because of all the rats live trapped on the atoll in 1971, 64 percent (420/658) were Rattus exulans, and only 36 percent (238/658) were Rattus rattus. No satisfactory explanation is at hand for why Rattus exulans evidently has failed to colonize Umap Islet.

Nine lizard species were collected on Namoluk Islet in June and July 1971 and placed in the Bernice P. Bishop Museum, Honolulu, Hawaii. Through the kind assistance of Alan C. Ziegler, Vertebrate Zoologist at the Bishop Museum, these specimens have been identified by Richard G. Zweifel of the American Museum of Natural History in New York. The collection may be taken as representative but not exhaustive because the sample size was relatively small (N=13), and specimens were acquired from only one of the five islets in the atoll. At least one species of gecko is known to be missing from the collection since it repeatedly eluded capture. This was a large variety (approximately 300 millimeters) that lives in the crown of coconut palms and has been observed eating smaller geckos.

All geckos are called pacharou (literally 'sticks to the rafters') on Namoluk, and the following four species are known to be present: (1) Cyrtodactylus pelagicus (BBM-5470), (2) Perochirus sp. (BBM-5477), (3) Gehyra mutilata (BBM-5478, BBM-5481), and (4) Lepidodactylus lugubris (BBM-5479, BBM-5480).

The Cyrtodactylus gecko was observed at night only on perhaps a half a dozen occasions. Whenever it was seen, it was always on or near the ground, and it quickly scurried into a hole when approached. All of the remaining species of geckos were seen nightly, and were ubiquitous in and on houses and on the trunks and in the crowns of coconut palms. All of the specimens taken were captured at night either in our corrugated tin outhouse or on the outside cement walls of our house. Generally, geckos became active about 4:30 P.M.; they were not to be seen outside during the day unless disturbed from hiding. Occasionally, geckos were observed feeding indoors during the day on ripe bananas, gnats and flies, and spilled cooking oil.

Skinks are very numerous on all of the islets throughout the underbrush and climbing on tree trunks (especially coconut and breadfruit trees). The five species listed below have been identified for Namoluk: (1) Eugongylus albofasciolatus (BBM-5469), (2) Lamprolepis smaragdina

(Dasia auct.) (BBM-5471), (3) Emoia cyanura (BBM-5472, BBM-5473), (4) Emoia boettgeri boettgeri (BBM-5474, BBM-5475), and (5) Emoia caeruleocauda wernerii (BBM-5476).

Namoluk people refer to the Eugongylus skink as kuel en le mweal 'lizard that hides in the helmet shell cooking vessel', and this species is much detested because of its large size and fearsome appearance. Furthermore, kuel en le mweal play a role in black magic which may help explain the general repugnance toward them; it is believed that to dream one has been bitten by one of these skinks is a sign that one has been sorcerized. Biggest among the lizards on the atoll, and usually slow and methodic of movement, Eugongylus can run rapidly when alarmed. Eugongylus are active during the day, and I have observed them feeding on ants and garbage while rummaging about in dead leaves and coconut fronds. These skinks make their home in holes in the ground under fallen logs and rocks. The Lamprolepis skink, called puwaroch locally, is extremely plentiful in the woods, and normally is to be found scaling the trunks of breadfruit trees. The three species of Emoia skinks are referred to collectively as puwal by Namoluk people. Although these species do climb trees on occasion, they are mostly seen running about in the underbrush and on fallen logs. The large monitor lizard (Varanus indicus) that was introduced by the Japanese for rat control on Truk and in the Lower Mortlock Islands (Etal, Lukunor, and Satawan Atolls) was never brought to Namoluk; its local name is kaluf. There are no snakes, land tortoises or amphibians on the atoll.

#### OTHER NON-AVIAN FAUNA

Both the green sea turtle (Chelonia mydas) (Wounamon), and the hawksbill turtle (Eratmochelys imbricata) (wounkele) frequent the lagoon and surrounding waters, with the former species being far more common. The turtles feed on extensive beds of "turtle grass" growing underwater near the lagoon shore, and now and again they come ashore to lay their eggs on the seaward side of Amwes Islet. Turtles of any size are killed whenever possible for their highly-prized meat and for their shells which are a valuable item of trade.

Several terrestrial decapod crustacea are plentiful on the atoll and form an important component of the land fauna. The coconut crab (Birgus latro), known to Namoluk people as manta, and a good-sized burrowing species--probably Cardisoma sp.--called rakum, are part of the regular human diet. Hermit crabs (Coenobita sp.) crawl nearly everywhere.

## AVIAN FAUNA

A short research note on the avifauna of Namoluk Atoll already has appeared (Marshall 1971). The purpose of this section is to expand the earlier account with additional information.

Fourteen families of birds containing twenty-one species have been recorded for Namoluk in addition to two other families that formerly were represented but now have died out. Of the fourteen families, seven (containing eleven species) are resident breeders on the atoll, four families (containing six species) are regular visitors to Namoluk, and another three families (with four species) are seen occasionally on the atoll. The Laridae comprise the most numerous family on Namoluk both in total numbers and number of species. Next most numerous are the Scolopacidae as regular migratory visitors.

In 1912, Girschner reported that:

Twenty-two birds were named [by Namoluk people], including the fruit dove (Carpophaga oceanica), which no longer existed at the time, but was ostensibly killed by the missionaries, a bright starling (Calornia pacifica), not very popular with the natives because it eats their bananas, papayas, etc., a kind of reed thrush (Calamoherpe syriax), the only bird with a pleasant song, a lovely red and black honeyeater (Myzomela rubrata), two herons, two sandpipers, two marsh birds, one kind of wild duck, various sea birds making their homes there for varying lengths of time, and finally the chicken. Since the typhoon of 1905, which devastated Ponape, the small parrot from that island lives on Namoluk, forced there by the storm (translation by Diana Maughan) (Girschner 1912:125-126).

Later, in a list of Namoluk vocabulary, Girschner gives the Namoluk names for twenty-one kinds of birds (1913:182), and from these two bits of information it is possible to identify positively sixteen species still to be found on Namoluk in 1969-1971. Although Girschner mentions "a bright starling" when discussing the twenty-two birds named by his informants, he later fails to provide the native name for this bird: mwi. This accounts for the discrepancy between his statement that there were twenty-two named birds (1912:125), and his list of only twenty-one bird names (1913:182).

In the annotated list of birds presented below, those mentioned by Girschner that can be identified are so noted. Namoluk names are given in parentheses after the common name; scientific identifications follow Baker (1951).

## ANNOTATED LIST OF NAMOLUK BIRDS

## PROCELLARIIDAE

WEDGE-TAILED SHEARWATER (nachukou)

Puffinus pacificus

Occasional visitor.

Common in the vicinity of Truk's high islands, I saw this species only once at Namoluk when a flock of ten birds accompanied the arrival of a government field trip vessel from Truk on 17 May 1971. The birds stayed all morning, skimming the waves and soaring up into the air, providing ample opportunity for positive identification. This bird is not mentioned in Girschner (1912, 1913), and shearwaters were never observed to land on the atoll.

#### PHAETHONTIDAE

WHITE-TAILED TROPICBIRD (uuk)

Phaethon lepturus

Resident breeder.

The population of tropicbirds on Namoluk is estimated not to exceed fifty birds, all of which nest in breadfruit trees (frequently in clumps of Asplenium nidus) on Amwes and Töinom Islets. Noted by Girschner (1913:182) by its local name, this bird is eaten by humans as often as it can be caught. The technique for capture is to note an adult sitting on a clutch of eggs, and for one person to set up a terrible racket at the base of the tree. The noise so frightens and distracts the bird that another person is able to climb up the opposite side of the tree and snatch the bird from its nest (cf. Bayliss-Smith 1972 for a similar report for Ontong Java).

#### SULIDAE

BROWN BOOBY (apwang)

Sula leucogaster

Occasional visitor.

A group of four birds was spotted just off the southwestern side of the atoll on 5 March 1970. Apparently, they had accompanied a ship which had arrived early that morning. A lone specimen was seen flying from the southeast to the northwest across the lagoon on 6 May 1971, soon after Typhoon Amy had passed through Truk District. While this species was noted by Girschner (1913:182), these were the only occasions that I observed boobies anywhere in the vicinity of Namoluk. I never saw them alight on the atoll.

#### FREGATIDAE

GREATER FRIGATEBIRD (asaf)

Fregata minor

Regular visitor.

Said by informants to breed in the Lower Mortlecks where they are reportedly sometimes kept as pets, these majestic birds do not nest on Namoluk. Usually they are seen soaring high in the sky preceding stormy weather, and none was ever observed by me to land on the atoll.

They were mentioned by Girschner (1913:182) who also noted that a frigatebird wing was stuck in the hair of the makal 'atoll chief' at his investiture (1912:162). Frigatebirds were spotted several times a month throughout the year.

## LARIDAE

BLACK-NAPED TERN (arar)Sterna sumatrana

Resident breeder.

I estimate the population of these terns at fifty to 100 birds. They nest on sandbars and exposed reef outcroppings, and were seen almost daily usually flying in pairs. Girschner (1913:182) notes them by their Namoluk name.

CRESTED TERN (arafao)Thalasseus bergii

Resident breeder.

Scanning the shallows and then plunging suddenly into the water to emerge with fish dangling from their beaks, these terns are among the more spectacular birds to watch on the atoll. Their numbers are not large -- estimated at no more than fifty birds -- and they nest on the uninhabited islets. Crested terns were mentioned by Girschner (1913:182).

BROWN NODDY (kokok)Anous stolidus

Resident breeder.

Easily the most abundant bird on the atoll, these noddies particularly like to nest in pandanus and in the crowns of coconut palms. My wife and I raised two as pets while resident on Namoluk. Brown noddies are eaten frequently by people who kill them with slingshots or by well-aimed rocks. Although this species was not cited by Girschner by its local name, it is inconceivable that it was not present in 1910. It appears likely that what Girschner recorded as kirekak (1913:182) is what now is called kokok on Namoluk, especially since the word kirekak is no longer in use.

BLACK NODDY (resh)Anous tenuirostris

Resident breeder.

Next to the brown noddy and the Micronesian starling, black noddies rank third in abundance on the atoll. They nest in breadfruit trees and are regularly captured for food. One was raised as a pet by my wife and me. Cited by Girschner (1913:182) as ras, black noddies are particularly well established on Amwes Islet.

WHITE OR FAIRY TERN (ekiek)Gygis alba

Resident breeder.

Mixed flocks of feeding fairy terns and noddies are used by Namoluk fishermen as indicators of probable schools of tuna, and the flocks of birds are followed by canoes and motorboats in pursuit of their quarry. Fairy terns number well over 700 birds and they commonly nest on the bare branches of breadfruit trees on the three largest islets. They were listed as present by Girschner (1913:182), and my wife and I acquired one as a chick which we kept as a pet the entire time that we lived on the atoll. In addition, we fed and released another fairy tern chick when it was old enough to fly. After the two species of noddy and the starling, fairy terns are guessed to rank fourth in abundance on the atoll.

## ARDEIDAE

REEF HERON (örö)Egretta sacra

Resident breeder.

Usually seen alone or sometimes in pairs, these striking white birds nest on all of the uninhabited islets. Nests were noted both in lagoon strand vegetation and in pandanus trees. Reef herons have been tamed and kept as pets by Namoluk people in the past, and informants assert that they eat skinks and geckos along with their more usual diet of fish. I estimate that there are no more than twenty-five to thirty of these birds on the atoll. They are mentioned twice by Girschner (1912:126, 1913:182).

## ANATIDAE

AUSTRALIAN GREY DUCK (rang)Anas poecilorhyncha

Occasional visitor.

This bird was not seen by me although Girschner mentions it in two places (1912:126; 1913:182). Informants report that the ducks come singly or in pairs to the main taro swamp on Namoluk Islet, and several different people reported having seen them at various times during the late 1960s.

## PHASIANIDAE

DOMESTIC FOWL (malok)Gallus gallus

Resident breeder.

This is the only bird on Namoluk known to have been brought to the atoll by human agency. There were approximately 450 fowl on Namoluk Islet in

1971, along with a small undetermined number gone wild on Amwes and Tbinom. Several different types are named and recognized locally, including pweshepwesh 'white', magalegal 'mixed colors', parapar 'red' (referring to Rhode Island red stock introduced from the Department of Agriculture on Truk), and sapan literally 'Japan', a grey, mottled variety. Nearly every domestic unit owns several fowl, and chickens constantly forage in and around people's houses. Chickens are identified as malokemwän 'rooster', lisinger 'hen', and lisiup 'chick'. While chicken flesh is a prized feast food, few people on the atoll consume hen's eggs.

## CHARADRIIDAE

PACIFIC GOLDEN PLOVER (kiling)Pluvialis dominica

Regular visitor.

The cry of the golden plover is familiar to every child on Namoluk as it is a regular winter visitor. Girschner (1913:182) mentions the plover, and a local story was related to me about where the plovers go when they leave Namoluk in the late spring. According to the story, the plovers fly up into the sky, higher and higher, until they reach heaven. There they lay their eggs. Once laid, the eggs immediately begin falling toward earth, and by the time they near the ground they have hatched into young golden plovers fully capable of flight and of finding their way once again to Namoluk's beaches.

## SCOLOPACIDAE

WHIMBREL (liakak)Numenius phaeopus

Regular visitor.

Normally feeding in solitaire by dipping their long, gracefully curved beaks into exposed sand flats at low tide, these birds were present on Namoluk throughout the winter months and as late as mid-June. Whimbrels were listed by Girschner (1913:182).

AMERICAN WANDERING TATTLER (lilil)Heteroscelus insaanum

Regular visitor.

Tattlers were observed almost daily from October to May running along the shore -- especially among exposed coral boulders. Normally, tattlers were found alone or in pairs. Girschner (1913:182) mentioned them by their Namoluk name.

RUDDY TURNSTONE (urupap)Arenaria interpres

Regular visitor.

Skittering along the sand in groups of from two to twenty birds,

turnstones spend their winters searching Namoluk's shoreline for food. From Girschner's report (1913:183), they were also present in the early 1900s.

COMMON SANDPIPER (maninkapuchupuch)

Actitus hypoleucos

Occasional visitor.

According to informants this species is infrequently encountered on Namoluk. I observed a single specimen at a distance of about fifteen meters on 17 July 1971, and at first I mistook it for a turnstone. My companion immediately corrected me and gave me the bird's correct Namoluk name. The sandpiper was feeding by itself right along the wave line on the ocean side beach, dipping its bill into the sand. Its back was greyish and its belly was white; closer inspection showed it to be smaller than a wandering tattler with a softer cry and a slightly shorter bill. I saw this species on Namoluk only once, and it was not recorded by Girschner.

#### CUCULIDAE

LONG-TAILED NEW ZEALAND CUCKOO (likapilei)

Eudynamis taitensis

Regular visitor.

I did not observe this bird, although I heard it twice on Namoluk Islet, and it was seen by other persons on Tōinom during my residence. Apparently, it passes through Namoluk on migration to and from its regular breeding grounds in New Zealand (cf. Baker 1951:215). The cuckoo was not mentioned by Girschner.

#### SYLVIIDAE

NIGHTINGALE REED WARBLER (lishok)

Acrocephalous luscini

Resident breeder.

Identified by Girschner (1912:126, 1913:182) as Calamoherpe syriax, this bird was observed by me daily. It feeds heavily on insects, and may be presumed to occur on all five islets. Of the three wild resident breeding land birds (starling, honeyeater, and warbler), the warbler is least abundant. Even so, I guess their population to be between 400 and 500 for the atoll.

#### STURNIDAE

MICRONESIAN STARLING (mwi)

Aplonis opacus

Resident breeder.

This glossy, black, inquisitive bird with a bright yellow eye is the most prolific and bold of Namoluk's land birds, and I estimate it to

be second in numbers only to the brown noddy. Nearly everywhere one goes in the brush on the atoll, a mwi tags noisily along. They are good mimics, and contrary to Girschner's assertion that the reed warbler is the only Namoluk bird "with a pleasant song," Micronesian starlings are capable of fine singing. My wife and I raised a young starling as a pet and often sat entranced at its virtuosity when it would launch into five minutes of uninterrupted whistles, trills, and warbles. Girschner (1912:125-126) identified the starling as California pacifica. These birds usually make their nests in pandanus and coconut trees, and they feed predominantly on fruit, notably on bananas, papayas, Morinda citrifolia, Cratava speciosa, and Eugenia sp. Our pet also enjoyed fresh raw fish, coconut meat, and ants, and along with his wild counterparts he was particularly fond of banana blossoms. Children hunt starlings with slingshots and eat them when they are successful.

## MELIPHAGIDAE

CARDINAL HONEYEATER (liteikepar)Myzomela cardinalis

Resident breeder.

These, the most beautifully colored of Namoluk's birds, were observed on all five islets; Girschner lists them as Myzomela rubrata (1912:126, 1913:182). They appear to feed almost entirely on nectar, and they are especially partial to banana blossoms. Honeyeaters are eaten by people only rarely.

## COLUMBIDAE

MICRONESIAN PIGEON (lisoam, witiwit, manekan)Ducula oceanica

Extinct breeder.

Girschner (1912:125) reports that this bird (which he identified as Carpophaga oceanica) formerly existed on Namoluk, but had been exterminated prior to his visit. Pigeons are good to eat, and probably were killed off as a result of the introduction of firearms by traders in the 1880s and 1890s before the German administration confiscated such weapons. The species has not reestablished itself on Namoluk, although reportedly it still occurs in the Lower Mortlocks (Nason, personal communication).

## PSITTACIDAE

PONAPE LORY (no Namoluk name)

Trichoglossus rubiginosus

Extinct breeder.

According to Girschner (1912:126), this species was blown to Namoluk in a typhoon in 1905, and apparently it still occurred on the atoll at the time of his visit. There are no lorries at present on Namoluk nor can anyone alive on the atoll in 1971 remember seeing them.

Besides mentioning the Micronesian pigeon and the Ponape lory, Girschner (1913:182) provides the Namoluk names for three other species that no longer are found on the atoll. By the names Girschner gives, none of my informants could describe these three species. This is probably a result both of vocabulary changes and of possible alterations in the avifauna during the sixty years intervening between Girschner's research and my own. Despite these slight discrepancies, however, one is struck by the remarkable stability of the bird species found on Namoluk during the twentieth century.

"A small type of heron" (erenshuumenwo) (Girschner 1913:182) can be only one of three possibilities, assuming the accuracy of reports contained in Baker (1951). Either the "small heron" was the black-crowned night heron (Nycticorax nycticorax), the rufous night heron (Nycticorax caledonicus), or the Chinese least bittern (Ixobrychus sinensis). All three of these species are reported for Truk (Baker 1951). On the basis of the size clue alone -- especially since Girschner's size comparison is presumably with the reef heron -- I would presume the Chinese least bittern to be the likeliest candidate for the bird Girschner records as erenshuumenwo.

A second bird mentioned by Girschner that no longer is found on Namoluk is "a small black and white bird" for which he gives the name lipukepuk. A study of Baker (1951) reveals only a single likely possibility for this species: Lonchura nigerrima, the black-breasted weaver finch. This finch is largely black and white, of small size, and is known from Ponape and possibly from Truk.

Finally, a "sea bird" named lishinirin matau is mentioned by Girschner (1913:182); I have absolutely no idea what this bird might be.

My informants in 1970-1971 named a seabird not listed by Girschner and unseen by me which I have been unable to identify. The Namoluk name is sapal, and it is described by people on the atoll as a dark-colored, blunt-winged, gliding seabird about the size of Anous tenuirostris (a petrel?). Its most prominent characteristic, stressed to me over and over again, is that it is always seen at sea and never ventures on land. In connection with this is a short story which not only "explains" this behavioral quirk, but also carries a message for its listeners emphasizing the importance of helping and sharing with others -- a major cultural value on Namoluk. The story notes that the ghost-man named Mweriker who was king of all the fish and birds kept his canoe in a canoe house in heaven. One day he called all of the fish and birds to come help him move his canoe from heaven down to the ocean. All of the fish and birds in the world came to help except two: a small minnow called til and a seabird named sapal. When Mweriker learned that these two had failed to assist him, he became very angry, and he decreed that henceforth all other fish and birds would feed upon til whenever they came upon them, and that the sapal was doomed never to set foot on land again. Mweriker decreed that should the sapal have the temerity to alight on dry land it would immediately die. This explains why, to this day, the sapal is never seen on land and why the

til is devoured by all other fish and birds.

### MARINE MOLLUSKS

A private collection of marine mollusk shells numbering over 400 specimens was made while on Namoluk. Discounting those cases where a given species is duplicated, I have identified approximately three-fourths of this collection using Abbott and Zim (1962). It must be emphasized that this represents only a portion of the total molluskan reef fauna of Namoluk. No effort was made to collect every species, and the collection is biased in favor of the more attractive shells to be found. Nevertheless, it is felt that the preliminary list given below may be of some interest to Pacific malacologists.

Of the sixty-seven species that I have been able to identify, six are exploited as edible shellfish by people on the atoll; Nerita polita, Lambis lambis, Bursa bubo, Charonia tritonis, Tridacna gigas, and Tridacna noae. The latter three species are eaten regularly, whereas the former three are consumed only irregularly.

Several mollusk shells have had or continue to have important uses in Namoluk culture. Tiger cowries (Cypraea tigris) with the crown of the shell cut away are used by women as effective scrapers for removing the outer skin of breadfruit, and from this tiger cowries derive their Namoluk name: pwil en mei literally 'breadfruit shell'. The horned helmet (Cassis cornuta) does not grow on Namoluk but Namoluk people used to import these shells from other atolls to be hollowed out and used as cooking vessels called mweal. With the easy availability of metal and glass containers today, helmet shells no longer are used in this way. The bull mouth helmet (Cypraecassis rufa), which is scarce on Namoluk, is employed in a manner similar to the horned helmet as a mixing receptacle for local herbal medicines. Two unidentified species of the family Spondylidae are found on Namoluk (Girschner [1912] identifies these as Spondylus flabellum Reeve and Spondylus rubicundus Reeve), and the one with a reddish-orange lip was sought by divers in precolonial times to make faulam 'valuable orange shell disks' which were polished, strung, and used as an important item of trade and decoration (Girschner 1912:134). Finally, as on other Pacific atolls before the introduction of iron, shells were shaped into tools. On Namoluk, the marlinspike (Terebra maculata) and the giant clam (Tridacna gigas) were fashioned into adze blades. The marlinspike became the blade of the kulukul (literally 'spinning adze' because the blade could be rotated), and the giant clam was transformed into sele 'flat chopping adze'. Examples of these two kinds of adze blades from surface archaeological collections I made on Namoluk have been placed in the Thomas Burke Memorial Washington State Museum, Seattle, Washington.

## PRELIMINARY CHECKLIST OF NAMOLUK MARINE MOLLUSKS

## THAIDIDAE

SETUM ROCK SHELL

Nassa serta

## HALIOTIDAE

BEAUTIFUL ABALONE

Haliotis pulcherrima

## TROCHIDAE

MACULATED TOP

Trochus maculatus

## TURBINIDAE

TAPESTRY TURBAN

Turbo petholatus

## NERITIDAE

POLITA NERITE

Nerita polita

## CERITHIIDAE

GIANT KNOBBED CERITH

Cerithium nodulosum

## STROMBIDAE

BUBBLE CONCH

Strombus bullia

HUMPED CONCH

Strombus gibberulus

SILVER CONCH

Strombus lentiginosus

BLOOD-MOUTH CONCH

Strombus luhuanus

COMMON SPIDER CONCH

Lambis lambis

GIANT SPIDER CONCH

Lambis truncata

## CYPRAEIDAE

PACIFIC DEER COWRIE

Cypraea vitellus

GOLD-RINGER

Cypraea annulus

LYNX COWRIE

Cypraea lynx

TIGER COWRIE

Cypraea tigris

ARABIAN COWRIE

Cypraea arabica

EGLANTINE COWRIE	<u>Cypraea eglantina</u>
RETICULATED COWRIE	<u>Cypraea maculifera</u>
EYED COWRIE	<u>Cypraea argus</u>
MOLE COWRIE	<u>Cypraea talpa</u>
ISABELLE COWRIE	<u>Cypraea isabella</u>
CARNELIAN COWRIE	<u>Cypraea carneola</u>
TORTOISE COWRIE	<u>Cypraea testudinaria</u>
HUMP-BACK COWRIE	<u>Cypraea mauritiana</u>
SNAKE-HEAD COWRIE	<u>Cypraea caputserpentis</u>
ERODED COWRIE	<u>Cypraea erosa</u>
MAP COWRIE	<u>Cypraea mappa</u>
NUCLEUS COWRIE	<u>Cypraea nucleus</u>
CHICK-PEA COWRIE	<u>Cypraea cicerula</u>
MONEY COWRIE	<u>Cypraea moneta</u>

## CASSIDIDAE

VIBEX BONNET	<u>Cassaria vibex</u>
BULL MOUTH HELMUT	<u>Cypraecassis rufa</u>

## BURSIDAE

GRANULATED FROG SHELL	<u>Bursa granularis</u>
GIANT FROG SHELL	<u>Bursa bubo</u>

## CYMATIIDAE

PACIFIC TRITON	<u>Charonia tritonis</u>
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## TONNIDAE

PARTRIDGE TUN	<u>Tonna perdx</u>
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## OLIVIDAE

PURPLE-MOUTHED OLIVE	<u>Oliva episcopalis</u>
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## VASIDAE

PACIFIC TOP VASE

Vasum turbinellus

## MITRIDAE

EPISCOPAL MITER

Mitra mitra

PONTIFICAL MITER

Mitra stictica

AUGER-LIKE MITER

Mitra terebralis

## VENERIDAE

LETTERED VENUS

Tapes literata

## CONIDAE

LEOPARD CONE

Conus leopardus

GENERAL CONE

Conus generalis

EBURNEUS CONE

Conus eburneus

MARBLE CONE

Conus marmoreus

PACIFIC LETTERED CONE

Conus litteratus

HEBREW CONE

Conus ebraeus

VIRGIN CONE

Conus virgo

DISTANT CONE

Conus distans

TEXTILE CONE

Conus textile

LITHOGRAPH CONE

Conus litoglyphus

GEOGRAPHY CONE

Conus geographus

## TEREBRIDAE

MARLINSPIKE

Terebra maculata

MUSCARIA AUGER

Terebra areolata

TIGER AUGER

Terebra felina

EYED AUGER

Terebra guttata

CRENULATA AUGER

Terebra crenulata

## PECTINIDAE

MANTLE SCALLOP

Gloripallium pallium

## TRIDACNIDAE

GIANT CLAM

Tridacna gigas

FLUTED GIANT CLAM

Tridacna noae

## LUCINIDAE

PACIFIC TIGER LUCINE

Codakia tigrina

PUNCTATA LUCINE

Codakia punctata

## TELLINIDAE

VIRGATE TELLIN

Tellina virgata

## CARDIIDAE

HEART COCKLE

Corculum cardissa

HALF-HEART COCKLE

Hemicardium hemicardium

In addition to the shells listed above, members of the following families (genus and species unknown) are represented in the collection: Arcidae, Pinnidae, and Spondylidae. Also to be found on Namoluk are the cephalopod chambered nautilus (Nautilus pompilius), although it is uncommon, and several species of octopi.

## ACANTHASTER PLANCI

Samples of gonad tissue from Acanthaster planci were taken, along with the soft tissue from Charonia tritonis, between 21 and 23 May 1970 for L. R. McCloskey to assist his work as a member of the Westinghouse Pacific Reef Starfish Expedition in 1969. Acanthaster has not exploded in numbers on Namoluk as it has elsewhere in the Pacific (e.g., on Truk), and the residue levels of organochlorine pesticides reported for the tissues of specimens from the atoll were very low (McCloskey and Deubert 1972).

## INSECTS

Several hundred Namoluk insects with accompanying information on place and time of capture (day or night) form a collection in the

Bernice P. Bishop Museum, Honolulu, Hawaii. Taken during 1970-1971, nearly all of these specimens remain to be identified. Two cockroaches (Periplaneta americana and Pycnoscelus surinamensis) and two flies (Musca domestica and Hemipyrellia sp., probably tagaliana) have been identified by Frank J. Radovsky, Acarologist, Bishop Museum in assistance of the Namoluk toxoplasmosis study since they were of potential significance as mechanical vectors for the parasite.

As a separate enterprise, vertebrate ectoparasites were collected from humans, pigs, cats, fruit bats, both species of rats, chickens, a black noddy, and the large Eugongylus skink for Nixon Wilson at the University of Northern Iowa. Identifications for some of these ectoparasites have now been published (Wilson 1972).

### VASCULAR FLORA

Duplicate collections of the vascular plants of Namoluk Atoll were made during June and July 1971, and have been deposited in the National Herbarium, Washington, D. C., and the Bernice P. Bishop Museum, Honolulu, Hawaii. With the exception of certain large well-known plants noted only by sight records (coconut, breadfruit, taro, banana, papaya), these collections are exhaustive. Although mosses, algae and fungi abound in the atoll's moist, humid climate, no attempt was made to gather nonvascular plants.

Girschner claims that in the first decade of this century Namoluk people could name about eighty plants (1912:125), and he provides a list of seventy-five of these names (1913:181-182). A few other plants not included in this list are mentioned elsewhere in the text of his article (1912:140, 141, 157). It is unclear from Girschner's account whether the list of plant names he collected refers specifically to plants growing on Namoluk at that time or whether it is simply a compilation of all plant names known to Namoluk persons, whether or not the plants actually grew on the atoll. Whatever the case, Girschner provides local names for twenty-three plants that are not found on the atoll today. While it is likely that some of this discrepancy is a result of language change, it is equally probable that some plant species have become extinct on Namoluk in the sixty years since Girschner's visit.

In 1971, Namoluk informants had local names for ninety-eight plants growing on the atoll. Fifteen of these plants are known to have been introduced since Girschner's research. These are as follows: Cenchrus echinatus, Panicum maximum, Zoysia matrella, Hedychium coronarium, Mirabilis jalapa, Annona muricata, Caesalpinia pulcherrima, Citrus aurantifolia, Hibiscus (ornamental hybrid), Ceiba pentandra, Cucurbita moschata, Polyscias fruticosa, Plumeria rubra, Coleus scutellarioides, and Capsicum frutescens. Of the twenty-three plants listed by Girschner that no longer occur on Namoluk, the name of only

one was familiar to most informants in 1971: kamwitei 'sweet potato'. The fact that sweet potatoes were introduced to the atoll in the replanting following the 1958 typhoon (Davis 1959b) probably accounts for this recognition. Sweet potatoes have not survived. Ten other plants for which there are no local names are known to have been brought to Namoluk within the past sixty years. The following species fall into this category: Araucaria heterophylla, Eragrostris tenella, Zephyranthes rosea, Moringa oleifera, Intsia bijuga, Pongamia pinnata, Acalypha hispida, Codiaeum variegatum, Barleria cristata, and Cordyline fruticosa.

As a general rule, where Namoluk people have a local name for a plant they have discovered uses for it, and where they have not given a plant a name they have not found ways to use it. Only three of the ninety-eight named plants are not used: Cenchrus echinatus, Paspalum conjugatum, and Paspalum distichum. The former two of these appear to have been named because of certain notable characteristics: Cenchrus echinatus is called sātan 'Satan' after its devilish thorns, and Paspalum conjugatum is known as fātilimwān 'male grass' ostensibly because it resembles the male member. Seven of the unnamed plants that occur on the atoll are used, and five of these are relatively recent introductions. None of the uses to which these plants are put is particularly important or unique. Digitaria setigera serves as a mulch in the taro gardens, Eragrostris tenella, Acalypha hispida, and Phyllanthus urinaria contribute material for leis, Moringa oleifera is exploited for firewood, Codiaeum variegatum is planted as a boundary marker, and the wood of Intsia bijuga is used in construction.

Fifty-seven families of vascular plants are found on Namoluk, consisting of 113 identified species and six specimens identifiable only by genus. This compares favorably with collections from similar islands elsewhere in the Carolines: Fosberg (1969) reports 103 species for Satawal, and Fosberg and Evans (1969) record 120 species from Fais.

Nine of the fifty-seven families present are represented by only one species known to have been introduced in the last sixty years. These are: Araucariaceae, Annonaceae, Moringaceae, Liliaceae, Bombacaceae, Cucurfitaceae, Araliaceae, Solonaceae, and Acanthaceae. The Gramineae are the most common on the atoll with thirteen species, followed by the Polypodiaceae with eight species represented.

Seventy-four Namoluk plants are employed in traditional herbal medicine. This is an impressive pharmacopoeia, representing as it does three-fourths of the locally named plants on the atoll. Readers interested in further details on the uses of plants in Trukese herbal medicine -- of which Namoluk herbal medicine is a part -- are referred to Mahony (1970).

At the present time, taro excavations exist only on Namoluk and Tōinom Islets, with the Namoluk swamp by far the larger. Amwes Islet formerly had a taro swamp nearly as big as that on Namoluk Islet, but when the Amwes community was abandoned in the late 1930s the swamp was

neglected, and it has become overgrown with a dense stand of Hibiscus tileaceus and Glochidion. Lukan and Umap Islets are too small to have a fresh-water lens, and consequently swamp taro has never grown there.

The atoll's only mangrove forest thrives along the sheltered lagoon shore of Amwes Islet, with both Rhizophora mucronata and Bru-guiera gymnorrhiza growing in abundance (see plates 3 and 13). Associated with the mangroves are substantial numbers of Thespesia populnea. Mangroves also grow singly or in small clumps on the reef between Amwes and Umap and between Tōinom and Lukan Islets (see plate 4).

In the annotated list of vascular plants that appears below, the letter "G" has been added following the local name for all plants mentioned by Girschner (1912, 1913).

Annotated List of the  
Vascular Plants of Namoluk Atoll  
Eastern Caroline Islands,  
Identifications by F. R. Fosberg

POLYPODIACEAE

*Asplenium nidus* L.

Found growing usually amidst dense brush or on the trunks of trees (especially breadfruit) (see plate 5). Leaves sometimes are used to line pits for preserved breadfruit and to wrap food for cooking; young, unopened leaf stalks are employed in local medicine. Occasionally, small bits of the trunk are cut to plug lashing holes on canoes to retard leakage. Namoluk I. Marshall 46 (US); "lek" (Birds nest fern); G.

*Athyrium blumei* (Bergsm.) Copel.

Grows commonly on the ground and on fallen logs in partial shade. Leaves are used as mulch for *Colocasia esculenta*, and the unopened leaf stalk, "trunk," and roots find use in herbal medicine. Namoluk I. Marshall 78 (US); "imwen liles."

*Nephrolepis acutifolia* (Desv.) Christ

Normally found epiphytic on tree trunks (see plate 6). Leaves serve as a wrapper for breadfruit, and the leaflets are plucked off as a sort of "adding machine" to keep track of breadfruit being harvested in heavily overgrown areas. The young leaf stalk is used in medicinal concoctions. Namoluk I. Marshall 26 (US); "amārā;" G.

*Nephrolepis biserrata* (Sw.) Schott?

To be found in dense brush and shade on the ground and on fallen logs (see plate 6). Uses are the same as for *Nephrolepis acutifolia* -- Namoluk people do not differentiate between these two species. Namoluk I. Marshall 68 (US); "amāra;" G.

*Polypodium scolopendria* Burm. f.

Very common on the ground and growing up the trunks of breadfruit and coconut trees. Leaves are used in leis and to cover food to be baked in an earth oven before dirt is piled on, and the leaves and runners are used medicinally. Namoluk I. Marshall 13 (US); "chichi."

*Pteris tripartita* Sw.

Grows in shaded locations near the center of the islets among thick brush. Leaves are used as mulch for *Colocasia esculenta*, and in herbal medicine. Namoluk I. Marshall 17 (US); "mwelines."

*Thelypteris interrupta* (Willd.) Iwats.

Found only in the taro swamps, it is uprooted and used as a mulch for all varieties of taro. Its leaves serve a medicinal function, and were formerly an ingredient in black dye (Girschner 1912:157). Namoluk I. Marshall 83 (US); "amāra en le pwōl."

*Vittaria incurvata* Cav.

Specimen was growing on the trunk of a large *Barringtonia asiatica* along the lagoon shore in heavy shade. Not used by Namoluk people. Tōinom I. Marshall 107 (US); no local name.

## ARAUCARIACEAE

*Araucaria heterophylla* (Salisb.) Franco

Only a single specimen exists on the atoll, 4 to 5 meters in height. It was brought to Namoluk from the Truk Agricultural Station on Moen, Truk, and planted next to a house. Not used by Namoluk people. Namoluk I. Marshall 61 (US); no local name (Norfolk pine).

## PANDANACEAE

*Pandanus* cf. *tectorius* Park.

At least four distinct named varieties are recognized by Namoluk persons: "fachewel" G. (108); "sillau" G. (113); "pokou" G. (114); and "fachaïre" G. (116). In addition, a fifth variety recognized on the atoll (of which there is only one specimen and for which

there is no local name) (115) reportedly was introduced from the Marshall Islands by way of the Truk Agricultural Station during the replanting following the devastation of typhoon Phyllis in 1958. Varieties of pandanus are referred to collectively as "fach." "Fachewel," "sillau," "fachaïre," and the unnamed Marshallese variety all grow in relatively open areas along the shore (particularly the lagoon shore); "pokou," by contrast, prefers sheltered areas in the interior of the islets. Leaves of "fachewel," "sillau," "fachaïre," and the introduced species from the Marshalls are used for making thatch for roofing canoe houses, cooking houses, and the few remaining traditional thatch sleeping houses; the ripe fruit of all these varieties either is chewed or eaten. The trunk of "fachewel" is used in sleeping house and canoe house construction, and the aerial roots that have not reached the ground (and hence are soft inside) are stripped into long fibrous strands that serve as "thread" to sew pandanus leaves into large panels for thatching. Aerial roots of "pokou" and "fachaïre," and occasionally those of "sillau" and the Marshallese variety also are used for this task. Aerial roots of "fachewel" and "fachaïre" that have reached the ground and grown tough and hard inside are valued materials for building fish traps. The fragrant blossoms of "fachewel" appear regularly in leis, and leaves of this variety are prized for weaving mats, hats, and handicraft items. Leaves of "pokou" are the preferred material for lining preserved breadfruit pits, and also for weaving baskets for breadfruit seeds. Strips of pandanus aerial root are cut to tie leaf packages of preserved breadfruit before cooking. The "bump" of a newly formed aerial root of "fachewel" may be used to treat boils; roots of all named varieties except "pokou," fruit and bark of "fachewel" and "pokou," and the leaves and the stem of the fruit stalk of "pokou" all are used in medicines. Namoluk I. Marshall 113, 114, 115, 116 (US); Toinom I. Marshall 108 (US).

Pandanus sp. (very young) ?

Although the botanist could not identify this species on the basis of the material collected, the anthropologist is quite certain that it is not simply a very young specimen of one of the other varieties. In asking informants for names of different plants, "lifach" was commonly volunteered. Significantly, Girschner also collected the name for this plant (1913:182). Furthermore, Namoluk persons readily identify the plant and know where a particularly large stand of it grows near a well at the edge of the main taro swamp. Although no fruit of this species were observed, Namoluk persons uniformly emphasized that they are red in color in contrast to the orange or yellow color of the fruit of (108), (113), (114), (115), and (116). Aerial roots of this plant are used in construction of fish traps and its leaves are employed in medicine. Namoluk I. Marshall 90 (US); "lifach;" G.

## GRAMINEAE

*Cenchrus echinatus* L.

Found in open sunny areas and distinguished by its small thorny burrs from which derives its Namoluk name; "sätan" from the English 'Satan', 'devil'. Namoluk people make no use of this plant which reportedly was introduced accidentally from Moen, Truk. Namoluk I. Marshall 29 (US); "sätan."

*Centotheca lappacea* (L.) Desv.

Forms a ground cover interspersed with ferns under coconut palms on the seaward side of the islet. No local use. Namoluk I. Marshall 74 (US); no local name.

*Chrysopogon aciculatus* (Retz.) Trin.

Prefers open areas especially around homes and public buildings. Not used by Namoluk people. Namoluk I. Marshall 20 (US); no local name.

*Digitaria setigera* Roth

Thrives along beach strand above the high water mark under coconut palms; this grass is gathered, dried, and used as a mulch in the taro gardens. Namoluk I. Marshall 35 (US); no local name.

*Eleusine indica* (L.) Gaertn.

Sunny, sandy cleared areas around homes provide the major habitat for "fätlimwech" whose name means literally 'hard to uproot grass'. Clumps of "fätlimwech" formerly were placed under newly built canoes just prior to launching in order to prevent drifting (the "uprooting" of the anchored canoe). This grass often is cooked along with taro or breadfruit to prevent scorching of the food although it is not eaten itself. When dried, "fätlimwech" finds use as a mulch for taro. The entire plant is pounded, mixed with the water of a green coconut, and drunk as an antidote for bloody stools on the assumption that its clinging properties will prevent further loss of blood. Namoluk I. Marshall 1 (US); "fätlimwech."

*Eragrostis tenella* (L.) Beauv.

The specimen collected was found growing in a shaded path among moss. Ostensibly brought to the atoll from Truk during the Japanese period, the seed stalks of this grass are sometimes used in leis. Namoluk I. Marshall 77 (US); no local name.

*Lepturus repens* var. *subulata* Fosb.

Found growing from a sand dune at the end of a long spit (see plate 7). This plant has no local uses. Amwes I. Marshall 124 (US); no local name.

*Lepturus repens* R.Br.? (sterile)

Located in an absolutely clear sunny field among other low grasses. The stems are used to manufacture small fish traps for several kinds of reef fish that frequent shallow areas. The leaf tip is used to stroke the throat while a chant is uttered in an effort to dislodge fish bones that inadvertently have been swallowed, and the seed and flower stalk is a medicinal ingredient. Namoluk I. Marshall 70 (US); "fätilen uu nom."

*Panicum maximum* Jacq.?

Reportedly brought to Namoluk from Etal Atoll in 1966 or 1967, only one large clump of this striking grass is to be found planted next to a person's house. The leaves are used in leis and in local perfume because of their pleasing aroma. Namoluk I. Marshall 27 (US); "paki ngeni" (Pampas grass).

*Paspalum conjugatum* Berg.

Grows in open sunny places among other grasses; Namoluk people have found no use for this plant. Namoluk I. Marshall 21 (US), 72 (US); "fätilimwän."

*Paspalum distichum* L.? (sterile)

Observed only in sunny clearings or along open paths. No local uses. Namoluk I. Marshall 65 (US); "unaf."

*Saccharum officinarum* L.

Cultivated in the taro swamp. Today the stems are chewed and sucked as a pleasant treat, although they used to be cooked and pounded to extract sugar when none was available from commercial sources. Juice from the stems is used medicinally. Namoluk I. Marshall 88 (US); "uou" (Sugar cane); G.

*Zoysia matrella* (L.) Merr.

Planted in open sandy areas around people's homes because it forms a comfortable mat on which to sit and because it chokes out taller grasses. Reportedly brought to Namoluk from Oneop Islet, Lukunor Atoll in 1959. Namoluk I. Marshall 2 (US); "sipa" (Japanese name).

## CYPERACEAE

*Fimbristylis cymosa* R.Br.

Prefers damp locations and sandy soil in areas that are not heavily overgrown with underbrush. The plant is used medicinally, and in olden times was used to make fishing lures (Girschner 1912: 153). Namoluk I. Marshall 3 (US); "puker uon fanu."

*Rhynchospora corymbosa* (L.) Britt.

To be found only in the taro swamps, the leaves, seeds and main root of this reed are used medicinally. Namoluk I. Marshall 84 (US); "kushukush."

## Cyperaceae

Specimen collected was found growing in the main taro swamp; identification by informants was only tentative. The leaves and stems are a medicinal ingredient. Namoluk I. Marshall 102 (US); "puker en le pwöl?"

## PALMAE

*Cocos nucifera*

Namoluk persons recognize numerous named varieties of coconut, many of which have been introduced to upgrade local copra production; no effort was made to collect botanical specimens of these different varieties (for a partial list see Girschner 1912: 140). Coconut is probably the most widely used plant on the atoll. The fruit is eaten at several stages (e.g., the soft gelatinous "meat" in green nuts, the hard crunchy copra, and the spongy mass filling a sprouted nut), the fluid of green nuts provides a refreshing beverage and is also an essential ingredient in many culinary and medicinal recipes, and "coconut cream" is wrung from grated copra as a sauce for many prized dishes. In addition, coconut meat serves as a major feed for pigs and domestic fowl, and when dried as copra provides the atoll's only cash crop. Coconut roots are used in manufacture of fish traps and woven bags, the wood provides lumber, posts, bowls, and formerly, weapons and fishing spears, and many parts of the palm are used for firewood. The main stem of the frond serves as a base to which pandanus leaves are attached in making thatch panels, and whole fronds are placed loosely on the roofs of canoe houses and thrown down as a ground cover in traditional style dwellings. Fronds also may be woven into very versatile baskets almost at a moment's notice, and are used to shield canoes from the rays of the sun and in fish drives. Leaves from unopened fronds afford material for handicrafts, traditional body decoration, holiday decorations and ornaments, toys, and model canoes. Several fronds woven together serve as torches to light the night when seeking

flying fish, and coconut leaves tied around tree trunks mark off land that is taboo (pwau) from exploitation. Numerous food containers and baskets are woven from coconut leaves. The midribs of single leaves act as toothpicks and make good brooms when bunched together and tied to a handle, and they are extremely important in knot divining (cf. Girschner 1912:199). Coconut sap is tapped for both sweet and fermented toddy, and heart of palm occasionally is eaten. Leaf midribs are used as sticks for roasting breadfruit nuts and small fish over a fire, and the "coconut boat" is used both as firewood and as a handy splint for broken limbs. The stems that attach to nuts are frayed and make satisfactory paint brushes, and the husk of the ripe nut is soaked and dried and used to make sennit cord and rope. Leaves may be turned into hats and fans, and in olden days coconut shell was formed into fishhooks, earrings and a host of other decorative and utilitarian items. Water from green coconuts forms a basic ingredient in a great many medicinal mixtures, and nearly every part of the tree is employed in different medicinal remedies. There are many other uses for coconut products not mentioned here, but it should be apparent that every part of the plant is used in some way. Marshall (sight record) "Nu" (Coconut); G.

#### ARACEAE

##### *Alocasia macrorrhiza* (L.) Schott

This plant largely grows wild on the atoll and is viewed as a famine food. Several parts of the plant are employed in traditional herbal medicine. A few people plant "kū" near their homes to make use of the large leaves as containers in food preparation, and children often break off a leaf as an impromptu umbrella. The flowers sometimes find their way into leis. Marshall (sight record) "Kū"; G.

##### *Colocasia esculenta* (L.) Schott

The corm of this plant, which is ready to eat in about six months from planting, forms one of the three staple crops on the atoll along with *Cyrtosperma taro* and breadfruit. The flowers are used in leis, and the leaves are used in medicine. Numerous sub-varieties are named by informants (cf. Girschner 1912:140; Mahony 1960:96). Marshall (sight record) "Oat" (Taro); G.

##### *Cyrtosperma chamissonis* (Schott) Merr.

Planted much more widely on Namoluk than *Colocasia esculenta*, *Cyrtosperma* is reputed to be more tolerant of salt spray and has the advantage that it remains edible when left in the ground for long periods of time. The corm is a mainstay of the Namoluk diet, leaves, stems and the corm are used in medicine, leaves are used to wrap food, and other parts of the plant are used as fertilizer in the taro swamps. Informants recognize many

different sub-varieties (cf. Mahony 1960:97-98). Marshall (sight record) "Pula" (Taro); G.

## LILIACEAE

*Cordyline fruticosa* (L.) Chevalier

This is what is called ti plant in Hawaii -- specifically, the kind with variegated green and purple leaves. This plant, brought to the atoll in 1967 from Moen, Truk by a Peace Corps Volunteer resident on Namoluk at that time, is planted near houses and lining paths in the village area. Namoluk I. Marshall 25 (US); no local name; ti in Hawaiian.

## AMARYLLIDACEAE

*Crinum asiaticum* L.

Often planted near houses for their attractive flowers, these lilies also grow wild in coconut groves near the lagoon beach. Their flowers are used in leis, the leaves are used to wrap food before cooking (especially certain kinds of fish), and the "skin" of the main trunk is sometimes incorporated into trolling lures for tuna and other game fish. Leaf fibers used to serve as wound dressings before gauze and cloth became available, and leaves, fruits, flowers and roots form ingredients in various medicinal recipes. Namoluk I. Marshall 36 (US), 105 (US); "pūllai" "kiop" (*Crinum* lily); G.

*Hymenocallis littoralis* (Jacq.) Salisb.

Planted near houses and lining paths in generally sunny areas; some have gone wild in the vicinity of the village. Uses for this plant are the same as for *Crinum asiaticum*; Namoluk persons do not distinguish between the two terminologically. Namoluk I. Marshall 19 (US); "pūllai" "kiop" (Spider lily); G.

*Zephyranthes rosea* (Spr.) Lindl.

Found only around people's houses where it is planted for its beautiful flowers; the flowers are used in leis and to decorate church altars. Namoluk I. Marshall 49 (US); "pilip" (Liāy).

## DIOSCOREACEAE

*Dioscorea alata* L.?

Usually found growing along the ground and climbing on underbrush in densely wooded areas near the middle of the islet. The aerial tubers are recognized as a potential famine food, but are not normally eaten. Namoluk I. Marshall 62 (US); "ep."

*Dioscorea bulbifera* L.

Wanders along the ground, over shrubbery, and up trees everywhere except near the beach. The aerial tubers, reported to be very bitter, are edible if cooked several times and traditionally were served as a famine food. Namoluk I. Marshall 63 (US); "pereka."

## TACCACEAE

*Tacca leontopetaloides* (L.) O.Ktze.

Formerly partially cultivated, this plant now grows wild in relatively open coconut groves near the beach. The bulbous, fleshy tubers once were collected and pounded into an edible flour, but with the advent of commercial supplies of flour this has ceased. The fruits are used in leis, the leaves are essential in the treatment of persons thought to have been bitten by a sea ghost and the stem has other medicinal uses. Namoluk I. Marshall 39 (US); "mökumök" (Arrowroot); G.

## ZINGIBERACEAE

*Curcuma* sp.

Several varieties were collected, however, all were unfortunately sterile which prohibited more positive identification. One kind (60), found in thick, black muck in one of the smaller taro excavations, is said by informants to have bright red flowers although these were not observed. It does not have a use or a local name on Namoluk. A second form (94) was collected in the main taro swamp and is called "afan." The fragrant leaves of "afan" are used in leis and love magic and to spice coconut cream. The bulb root also plays a role in love magic, and along with the leaves is employed in many herbal remedies. A final type (106) also was gathered in the taro swamp and its flowers and fruits are incorporated into leis; this kind is said by informants to have been introduced from Truk. Namoluk I. Marshall 60, 94, 106 (US); "afan" (94) G., no local name (60), (106).

*Hedychium coronarium*

Partially cultivated in the taro swamps, this plant is not common on the atoll but is highly prized for its deliciously fragrant blossoms which are used in leis. Namoluk I. Marshall 93 (US); "sinser" (White ginger).

## MUSACEAE

*Musa sapientum* L.

As with coconuts, a great many named varieties of banana grow on the atoll. Some are prized for eating raw, others for cooking,

and a few as food for domestic animals. Bananas are semi-cultivated both in the village area and in the bush; people know the locations of their banana plants, and check them periodically to see if any are ripe. Banana leaves are used in earth ovens, offer fiber for leis (and, formerly, for wrap-around clothing woven on hand looms), and serve as ready-made plates, table mats, food wrappers and umbrellas. Various parts of the banana plant are employed in traditional medicine. Marshall (sight record). "Uuch" (Banana); G.

#### PIPERACEAE

##### *Piper fragile* Benth.

Namoluk people call this common vine "atoopei." It is found in heavily shaded areas trailing along the ground and off shrubbery, and occasionally twining around large trees (see plate 6). "Atoopei" has a number of medicinal uses. Namoluk I. Marshall 15 (US); "atoopei;" G.

##### *Piper ponapense* C.D.C.

The specimen is juvenile, but the information given below was sufficient for the botanist to reliably distinguish it from *P. fragile*. This vine grows in thickly wooded areas away from the beach. Namoluk persons call it "anek," and it is an important constituent in leis and love magic. In addition, stems and leaves of "anek" were combined with leaves of *Polypodium scolopendria* to make a crown placed on the head of the atoll chief on his investiture when the traditional political system was still intact. Namoluk I. Marshall 89 (US); "anek;" G.

#### URTICACEAE

##### *Pipturus argenteus* (Forst.f.) Wedd.

The specimen was growing in a rocky area of dense vegetation about 45 meters from the beach. Trunk wood and saplings are used in house construction, the bark formerly was used to manufacture a very strong fishline, and the leaves are fed to pigs. When mixed with grated copra, the fruit are applied as a treatment for skin rashes, and the bark also finds use in medicines. Namoluk I. Marshall 51 (US); "aroma."

##### *Laportea ruderalis* (Forst.f.) Chew

This plant, whose local name means 'ants' coconut palm', grows in cleared coconut groves near the beach. The entire plant is used in certain medicines. Namoluk I. Marshall 38 (US); "an ukech nu."

## MORACEAE

*Artocarpus altilis* (Park.) Fosb.

Breadfruit in its many named sub-varieties, forms the preferred staple in the Namoluk diet (cf. Girschner 1912,139 for a list of named varieties on Namoluk in 1910). In addition to eating both the fruit and the seeds of the seeded types, Namoluk people use breadfruit leaves as plates and wrappers for food to be cooked. Large trees provide the major local source of lumber for heavy construction, for canoe hulls, and for many important cooking utensils. Dead branches frequently are gathered for firewood, and the sticky sap serves as a caulk for canoes. Finally, nearly every part of the plant is employed in herbal medicine. Marshall (sight record). "Mei" (Breadfruit tree); G.

*Ficus tinctoria* Forst.

A common understory component in breadfruit forests. The fruits are eaten as a famine food and woven into leis, and saplings are used for outrigger attachments and other canoe parts and in house construction. Bark is formed into lures for pelagic fish, Y-shaped branches are cut as rims for two types of fishing net, and the leaf sheath and roots are used medicinally. Namoluk I. Marshall 10 (US); "auwen;" G.

*Ficus prolixa* var. *carolinensis* (Warb.) Fosb.

There is only one of these majestic trees in the whole atoll, located in a dense forest of *Premna obtusifolia* and *Glochidion* near the ocean side of Amwes Islet. The trunk of this tree is almost 3 meters in diameter and the tree stands an estimated 25 meters high. There are no major uses for this tree, although its aerial root bark is an ingredient in herbal medicine. Amwes I. Marshall 119 (US); "kiliau" (Banyan tree); G.

## POLYGONACEAE

*Polygonum minus* var. *procerum* (Danser) Steward

Grows only in taro bogs. Uprooted and used as a mulch for *Cyrtosperma chamissonis*. Young leaves are used in medicine for women. Namoluk I. Marshall 79 (US); "opulbulbu;" G.

## AMARANTHACEAE

*Achyranthes aspera* L.

Rocky soil in relatively clear coconut groves is where this plant is to be found. It has several medicinal uses. Namoluk I. Marshall 76 (US); "uökö."

*Alternanthera sessilis* (L.) R.Br. ex R.&S.

Occurs only in the taro excavations. No local uses. Namoluk I. Marshall 95 (US); no local name.

NYCTAGINACEAE

*Mirabilis jalapa* L.

Planted next to people's houses where its flowers may be readily picked for leis. Its local names mean "turtles' perfume" and "three-o-clock," the latter in reference to its blossoms which regularly open about 3:00 P.M. The flowers are used medicinally. Namoluk I. Marshall 43 (US); "apetin woun" "kuhok elu."

*Pisonia grandis* R.Br.

These large trees are found just above the high water mark, usually along the lagoon shore beach. Saplings are used for fences and dead branches make good firewood; Namoluk people say the wood is too weak for other uses. The leaves are fed to pigs, are used as a mulch for *Colocasia esculenta*, and are employed medicinally. Namoluk I. Marshall 48 (US); "mwuk;" G.

PORTULACACEAE

*Portulaca australis* Endl.

Grows in comparatively open areas, e.g., along paths in partial shade. The leaf stem is a medicinal ingredient. Namoluk I. Marshall 16 (US); "puson."

ANNONACEAE

*Annona muricata* L.

Only a single specimen exists on the atoll which was brought from Truk and planted for its edible fruit. Namoluk I. Marshall 22 (US); "sasaf" (Soursop).

LAURACEAE

*Cassytha filiformis* L.

Found in beach strand vegetation in a matted, tangled mass at the high water mark, this plant's stem is used medicinally by Namoluk people. Namoluk I. Marshall 75 (US); "u8lau."

## HERNANDIACEAE

*Hernandia sonora* L.

Found growing nearly everywhere, the wood of this tree is used as firewood, and its leaves and seeds are incorporated into medical concoctions. Girschner mentions its leaves as an ingredient in black dye (1912:157). Namoluk I. Marshall 18 (US); "akurang;" G.

## CAPPARIDACEAE

*Crateva speciosa* Volk.

Grows all over the interior portions of the islets amidst heavy brush. The pungent fruit is eaten but not cultivated, and it is also sliced thin and woven into leis. The trunk often is cut and used as a disposable coconut husking stake, and the leaves serve as mulch for *Colocasia esculenta* and as a medicinal ingredient. Namoluk I. Marshall 50 (US); "afuch."

## MORINGACEAE

*Moringa oleifera* Lam.

One large tree growing next to a house is the only one known for the entire atoll; this specimen is remembered by informants to have been introduced by the Truk Agricultural Department in the replanting after typhoon Phyllis in 1958. Some informants heard that the species had been brought to Truk from the Philippines and that its leaves are edible in soup, although no one on the atoll has tried them. Its only local use is as firewood. Namoluk I. Marshall 30 (US); no local name.

## LEGUMINOSAE

*Caesalpinia pulcherrima* (L.) Sw.

All of the specimens on the atoll have been planted next to people's houses to facilitate gathering the blossoms for leis; both the variety with bright yellow and that with striking red-orange flowers occur on Namoluk. Occasionally, large branches are cut into coconut husking stakes. Although "simota" grew on Namoluk pre-typhoon Phyllis, they were all destroyed in the storm and were reintroduced from Truk in 1958 or 1959. Namoluk I. Marshall 7 (US), 86 (US); "simota" (7), (86) (Flame tree).

*Canavalia cathartica* Thou.

Usually grows near the beach in coconut plantations where it frequently climbs on trees and shrubs. The hard seeds are strung for leis, and the leaves serve in local medicine. Namoluk I. Marshall 41 (US); "anikat;" G.

*Derris elliptica* (Roxb.) Benth.

A vine that is found only in deeply shaded, overgrown areas near the center of the islets. Formerly, its roots were pounded and used to poison fish in tide pools so that they could be easily gathered (Girschner 1912:153). Its stems have medicinal properties. Namoluk I. Marshall 45 (US); "uup."

*Derris trifoliata* Lour.?

This low shrub was located in a cleared shady area under coconut palms with almost no underbrush. It has no local uses. Amwes I. Marshall 121 (US); no local name.

*Intsia bijuga* (Colebr.) O.Ktze.

Informants say this tree has not grown on Namoluk for very many years. They speculate that its seeds may have drifted to Namoluk and taken root; one informant resident in Palau for several years asserts that it grows there. It is found in a thick forest of *Pemphis acidula* and *Cordia subcordata* with no underbrush. The wood is said to be very strong, and Namoluk people use it in building construction and at stress points for ropes on sailing canoes. Tbinom I. Marshall 111 (US); no local name.

*Pongamia pinnata* (L.) Merr.?

A single example of this tree is all that was observed. It was growing just above the high water mark on a heavily eroded bank along the lagoon shore. Not used locally. Amwes I. Marshall 122 (US); no local name.

*Vigna marina* (Burm.) Merr.

Found along beach strand under coconut palms and extending out to the high water mark. Juice expressed from leaves of this vine is used to treat chickens suffering from "eye sickness" by squeezing it into their eyes, mouths and anuses. Juice from the pounded stems forms part of a medicinal concoction drunk by women for stomach pain and slight cough. Its leaves were once an ingredient in black dye (Girschner 1912:157). Namoluk I. Marshall 34 (US); "oolu;" G.

## RUTACEAE

*Citrus aurantifolia* (Christm.) Swingle

These small trees are planted near houses and in the interior, and are prized especially for their fruit. The limes are eaten, and their juice is squeezed over raw fish. Leaves also figure in cooking as a flavoring for soup, occasionally are boiled as a substitute for coffee and are used in herbal medicine. Supple

saplings are bent into frames for fish nets, and the wood is fashioned into adze handles and outrigger attachments for canoes. Namoluk I. Marshall 28 (US); "laines" (Lime).

*Citrus aurantium* L.

These trees are both planted and grow wild in well-watered, partially shaded areas away from the beach. The extremely sour oranges are eaten or squeezed for their juice to which sugar is added. Fragrant roots are used in leis, the tough wood sometimes is used for coconut husking stakes, and long, straight branches formerly were very important as staves in stick dancing and warfare (these staves, like the plant, were called "kurukur"). The bark is used in medicines. Girschner reports that the thorns were used as tattoo needles (1912:131), although later he makes the strange comment "There are no oranges." (1912:141) (Translation by Diana Maughan). Namoluk I. Marshall 64 (US); "kurukur" (sour orange tree); G.

SIMAROUBACEAE

*Soulamea amara* Lam.

To be found in dense brush everywhere, but particularly near the beach. Long saplings are used as poles for poling canoes along the reef, and in building construction; small saplings are used to make the outrigger platforms on canoes. Medicines are made using the bark as an ingredient. Namoluk I. Marshall 53 (US); "māras;" G.

MELIACEAE

*Aglaiia ponapensis* Kanehira?

Only a single leaf was collected, so the identification is tentative indeed. This species has not been recorded previously outside Ponape and the genus is not known hitherto from any coral atoll. Only a single specimen of this tree grows in the whole atoll, just behind the mangrove swamp right at the high water mark on the lagoon shore of Amwes Islet. The tree was about 11 meters high. This plant is not used locally. Amwes I. Marshall 118 (US); no local name.

EUPHORBIACEAE

*Acalypha hispida* Burm.f.

Planted next to people's houses in the bright sunshine, this plant was brought to Namoluk from the Truk Agricultural Station on Moen. Its red, fuzzy, streamer-like flowers are used in leis. Namoluk I. Marshall 59 (US); no local name.

*Codiaeum variegatum* (L.) Bl.

This colorful plant often grows adjacent to houses, and its major use is to mark boundaries between pieces of land and to delineate graves. Namoluk I. Marshall 14 (US); no local name (Croton).

*Euphorbia chamissonis* (Kl. & Gke.) Boiss.

Found growing only on the ocean side of a long sandspit among grasses and vines above the high water mark (see plate 7). Used in local medicine. Amwes I. Marshall 123 (US); "pisinom;" G.

## Glochidion?

Grows in thickly wooded, deeply shaded, moist areas near the center of the islets. Although the wood is not very strong, it is sometimes used in erecting temporary shelters away from the village area. The unopened leaves have a medicinal use. Namoluk I. Marshall 58 (US); "nge;" G.

*Phyllanthus amarus* Sch. & Thell.?

The specimen collected was located in an open space in dappled shade. Not used locally. Namoluk I. Marshall 31 (US); no local name.

*Phyllanthus urinaria* L.

Occurs only in the taro swamps; its small red berries are infrequently used in leis. Namoluk I. Marshall 85 (US); no local name.

## SAPINDACEAE

*Allophylus timorensis* Bl.

A small tree usually found mixed with other brush along the shore. The wood is used for lean-to shelters and as fuel; the leaves are reputed to reduce swelling when crushed and applied to painful swollen bruises. Namoluk I. Marshall 73 (US); "nguner."

## TILIACEAE

*Triumfetta procumbens* Forst.f.

Prefers the relatively cleared ground beneath coconut palms near the shore. Juice from the leaves is squeezed on goggles to prevent fogging up when spear fishing. The leaves also are used in leis and in medicine, and the pounded fruits are mixed with water from a drinking coconut and gargled to relieve a painfully sore throat. The local name for this plant is the same as that for *Acanthaster planci*, the Crown-of-thorns starfish (perhaps because of its spiny fruits?). Namoluk I. Marshall 40 (US); "ara."

## MALVACEAE

*Hibiscus tiliaceus* L.

On Namoluk, this useful plant only grows in or very near the taro bogs at the middle of the three largest islets. The wood is used in house construction, for the outrigger struts on paddling canoes, as poles for poling canoes on the reef, for the long poles employed in picking breadfruit, in the manufacture of model canoes, and formerly in making men's dance ornaments (Girschner 1912:137). The young leaves, bark, and unopened flowers find their way into medicines, especially those for women. Formerly, bark fibers from this plant were woven into clothing on hand looms, and these fibers also were made into fish nets, slings and twine (Girschner 1912:131, 157). According to Girschner (1912:167), hibiscus bark also was used to tie the umbilicus of newborn infants. Namoluk I. Marshall 87 (US); "kilifö;" G.

*Hibiscus* (ornamental hybrid)

These attractive bushes are planted around houses. The only variety found on Namoluk in 1969 boasted a bright pink single blossom with a maroon and white center. Informants emphasized that varieties with other colors of blooms had grown on the atoll in the past, and Marshall introduced a dark red type with a deep maroon center from Moen, Truk in December 1970. This latter type was growing well and had bloomed by July 1971. The flowers are used in leis and as decoration for festive occasions (e.g., on the church altars). Namoluk I. Marshall 47 (US); "rous."

*Thespesia populnea* (L.) Sol. ex Correa

This tree grows right at the high water mark along the lagoon shore of Töinom and Amwes Islets. Saplings are used for fishing poles and formerly served as fishing spears; the wood is carved into canoe paddles, and the bark is used in herbal medicine. Töinom I. Marshall 109 (US); "pönö;" G.

## BOMBACACEAE

*Ceiba pentandra* (L.) Gaertn.

Grows only in the interior of the main islet of Namoluk where there is plenty of ground water. The cotton-like mass surrounding the seeds enclosed in a heavy pod is used for stuffing pillows. Namoluk I. Marshall 24 (US); "poupou" (Cotton tree).

## GUTLIFERAE

*Calophyllum inophyllum* L.

These gnarly, hardy trees stand right above the high water mark on the lagoon shore, and many reach a height of 15 to 20 meters.

Girschner (1912:136) mentions that, "Fruits of *Calophyllum inophyllum* are cut crosswise and used for pearls and discs" (translation by Diana Maughan). The dense, durable wood has many uses on Namoluk, e.g., house posts for canoe houses and dwellings, carved bowls (wood from the thick roots also is made into bowls with strikingly beautiful grain), goggles for spearfishing, canoe paddles, outrigger struts, and several other specifically named canoe parts. Formerly, soot from "rakich" wood was rubbed into tatoos (Girschner 1912:131-132). The flowers are used in leis and to scent homemade perfume, and the leaves frequently are transformed into effective toy sailing canoes for children. Both leaves and bark are employed in medicines. Namoluk I. Marshall 98 (US); "rakich;" G.

*Mammea odorata* (Raf.) Kost.

Not especially common on Namoluk; the specimen collected was growing among dense brush in a coconut grove. The wood is used for house posts and other construction, and for making axe handles. Both the flowers and fruits may be used in leis, and the leaves are employed in treatments administered by traditional massage masters. The bark and the skin of the fruit also play a role in local medicine. Namoluk I. Marshall 97 (US); "lifaus;" G.

#### CARICACEAE

*Carica papaya* L.

Although no effort was made to collect specimens, several distinct varieties of papaya exist on Namoluk. Most common is the kind with small pear-shaped fruit; Marshall introduced a variety from Nama Island with watermelon-sized fruit that was bearing by July 1971. Papaya plants are cultivated, particularly around homesites, although a number are growing wild in the bush. The fruit is eaten, the flowers are used in leis, the leaves are scattered around *Colocasia esculenta* as mulch, and the hollow leaf stem sometimes serves as a ready made straw. Marshall (sight record). "Momiap" (Papaya); G.

#### CUCURBITACEAE

*Cucurbita moschata* Duch. ?

"Pwönkin" is the Namoluk rendition of the English word for pumpkin, although this is not the familiar orange pumpkin popular at Halloween. The plant appears to grow in any sunny open spot near the beach, and it is always cultivated. The fruit and the young leaves are eaten (the latter in soup). Namoluk I. Marshall 37 (US); "pwönkin" (Squash).

## LYTHRACEAE

*Pemphis acidula* Forst.

An extremely thick forest of this small tree covers the north-eastern end of Tbinom Islet, and scattered clumps grow elsewhere in the atoll in sandy areas along the shore. The lack of any underbrush in the "chekis" forest is especially striking (see plate 8). This tree provides the strongest wood on the atoll -- the heartwood chipped the blade of a machete being used to cut it! "Chekis" wood is used to make thatching needles (cf. Girschner 1912:147), and the wood is the preferred and common material for coconut husking stakes and for stakes to which canoes are tied in shallow water areas. It is also used in building construction and formerly was made into weapons. The bark has medicinal functions. Tbinom I. Marshall 110 (US); "chekis;" G.

## RHIZOPHORACEAE

*Bruguiera gymnorhiza* (L.) Lam.

One of two species of mangrove found on the atoll, this species is restricted to the large mangrove swamp located on the lagoon shore of Amwes Islet (see plate 3). It lacks the spider-like aerial roots of its companion species. In the old days the bark was pounded, mixed with charcoal and breadfruit tree sap, and used as a black paint for canoes. Today its wood is exploited for poles for poling canoes along the reef and occasionally for building material. Both the bark and the bright red flowers have medicinal uses. Amwes I. Marshall 120 (US); "e'ng" (Mangrove); G.

*Rhizophora mucronata* Lam.

Far more plentiful than *Bruguiera gymnorhiza*, this species of mangrove is dominant in the large mangrove swamp on Amwes Islet and is the type that may be found growing in isolated clusters on the open reef between Amwes and Umap Islets (see plate 4) and between Tbinom and Lukan Islets. Large branches and aerial roots are used to make multi-pronged fishing spears, men's traditional combs, and fish traps. Occasionally, the trunk is cut to serve as a stake for mooring canoes or for husking coconuts. The bark and leaves are used medicinally. Amwes I. Marshall 117 (US); "chia" Mangrove); G.

## LECYTHIDACEAE

*Barringtonia asiatica* (L.) Kurz

One of the most common trees on the atoll, "kul" grow along the ocean and lagoon shores of all five islets. Often much of their root structure is exposed from erosion but this does not kill the

tree. Namoluk people use the wood for fuel, and the leaves to wrap food. The seeds are grated and introduced into tide pools at low tide to poison small fish. Fish so poisoned are perfectly safe for human consumption. Seeds, flowers and leaves all serve in local medicines. Namoluk I. Marshall 101 (US); "kul;" G.

*Barringtonia racemosa* (L.) Bl.

Found growing in thick black mud in a small taro excavation near the middle of Namoluk Islet in heavy shade; uncommon. The bark is used medicinally. Namoluk I. Marshall 125 (US); "asol."

#### MYRTACEAE

*Eugenia* sp.

These tall (10 to 15 meters) trees stand along the edge of the taro swamps and produce a fleshy, apple-like fruit that is red when ripe and much sought after when it comes into season. Large branches are cut into struts leading to the outrigger on sailing canoes, and the trunk sometimes serves as house posts in building construction. Leaves and bark are constituents of herbal medicines. Namoluk I. Marshall 71 (US); "feniap" (Mountain-apple tree).

#### COMBRETACEAE

*Terminalia catappa* L.

These small trees (3 to 4 meters) are found in dense brush near the middle of the islets. The edible seeds sometimes are gathered as a snack, the trunk may be used for house posts when the tree is large, and the larger branches are used in house construction. Namoluk I. Marshall 67 (US); "sif."

*Terminalia samoensis* Rech.

All specimens observed were growing right at the high tide mark. The red skin and kernel of the nut are eaten irregularly, and the wood has many uses, e.g., for wooden bowls, in building construction, and for canoe paddles. Namoluk I. Marshall 54 (US); "kin;" G.

#### ONAGRACEAE

*Ludwigia octovalvis* (Jacq.) Raven

This plant grows in the taro bogs and the whole plant is used medicinally. Namoluk I. Marshall 80 (US); "aieð;" G.

## ARALIACEAE

*Polyscias fruticosa* (L.) Forst

Purposefully planted as a hedge lining paths, graves, and land boundaries all over the islets. Clothes often are draped over these hedges to dry in the sun. The plant reportedly was brought to the atoll from Dublon, Truk by an Okinawan man who married and resided on Namoluk during the 1920s and 1930s. Namoluk I. Marshall 44 (US); "sikamor."

## UMBELLIFERAE

*Centella asiatica* (L.) Urb.

Grows as a ground cover in damp shady places. When burned on a fire, the leaves are used to treat a skin ailment also called "mwoi" on the underside of the foot. Namoluk I. Marshall 32 (US); "mwoi."

## GENTIANACEAE

*Fagraea berteriana* var.

This tree reaches a height of at least 10 meters, and the specimen collected was growing as understory in a mixed coconut-breadfruit forest near the seaward side of the islet. The flowers are prized for leis (the plant's local name means literally 'to anoint with a fragrance'), and the yellowed leaves and the flowers are thought to have medicinal properties. Namoluk I. Marshall 100 (US); "apet."

## APOCYNACEAE

*Neiosperma oppositifolia* (Lam.) Fosb. & Sachet

The trees observed were clustered along a wave-eroded bank on the seaward side of the islet in a very rocky area. Their roots were washed by waves at high tide and they were helping hold the land against the destructive action of the sea. Informants said the flat seed kernels may be eaten, though they are not normally consumed on Namoluk. The wood serves in building construction, as poles for poling canoes, and as material for canoe paddles. The leaves are used in local medicine. Namoluk I. Marshall 99 (US); "umwa;" G.

*Plumeria rubra* L.

Nearly all the plumeria on the atoll are planted in clearings adjacent to dwellings; the plant is reputed to have been brought to Namoluk from Etal Atoll during the Japanese period. Flowers adorn leis and scent local perfume (made with a coconut oil base), the

sticky white sap is used as glue, and the large stems sometimes are carved into goggle frames for spearfishing. Namoluk I. Marshall 11 (US); "pumeria."

#### CONVOLVULACEAE

##### *Ipomoea littoralis* Bl.

This vine occurs only in the taro swamp where it clambers over other vegetation. Its morning glory like flowers occasionally find their way into leis, and the leaves and stems -- when mixed with unfermented coconut toddy and baked in an earth oven -- provide a famine food. Flowers, stems and leaves all are used medicinally. Namoluk I. Marshall 81 (US); "rokurok," G.; "imwen uut."

##### *Operculina turpethum* (L.) Manso

The thick white sap of this vine that grows only in the taro bogs is said to sting if it comes into contact with eyes, scratches and cuts. When nothing better is at hand, it sometimes is used as a temporary rope, and the stem and unopened leaves mixed with other plants are used medicinally. Namoluk I. Marshall 92 (US); "afaamach;" G.

#### BORAGINACEAE

##### *Cordia subcordata* Lam.

These trees, which may reach a height of 8 or 9 meters, usually grow in thick stands; the specimen collected was taken from a mixed forest of *Cordia subcordata* and *Pemphis acidula* near the ocean side of Töinom Islet (see plate 8). The wood is carved into canoe paddles and prows, poles for poling canoes, and also provides a general building material. The flowers are sought for leis, and the bark and leaves have medicinal uses. Töinom I. Marshall 112 (US); "anau," G., "aleu;" G.

##### *Tournefortia argentea* L.

Found only near the beach in sandy soil, these useful trees easily grow to 10 meters in height. The wood is preferred for specific outrigger canoe parts, for goggles, for carved masks, for firewood, and sometimes for house posts. When leaves of *Triumfetta procumbens* are unavailable, juice squeezed from "amöloset" leaves is used to prevent goggles from fogging up under water. Young, unopened leaves are used in treatment of persons afflicted by sea ghosts, and the immature flower stalk is employed in love magic. Namoluk I. Marshall 42 (US); "amöloset;" G.

## VERBENACEAE

*Premna obtusifolia* R.Br.

This plant seems to grow almost everywhere on the islets above the high water mark and outside the taro bogs. The flowers are woven into leis, the leaves are important in love magic and to flavor overripe breadfruit (although the leaves themselves are not eaten), and the wood forms one of the most widely used fuels. In days when commercial matches were unknown or unavailable, wood from this plant was used to make a drill for starting fire by friction (cf. Girschner 1912:141). Leaves of "yeaar" covered with bumps are used to wash skin to get rid of pimples. Namoluk I. Marshall 12 (US); "yeaar;" G.

*Stachytarpheta urticifolia* Sims

Found growing in a cleared area near a path; no local uses. Namoluk I. Marshall 66 (US); no local name.

## LABIATAE

*Coleus scutellarioides* (L.) Benth

Although one variety of coleus was introduced by Marshall in December 1969 and grew only outside his house, other varieties were to be found growing to a height of 1 to 1 1/2 meters alongside wells in the middle of Namoluk Islet. The juice of the leaves sometimes is squeezed onto cuts to retard bleeding. Namoluk I. Marshall 6 (US), 56 (US); "karamat" (Coleus).

*Ocimum sanctum* L.

This delightfully fragrant herb is planted in sunny cleared spaces adjacent to people's dwellings. The pungent flower stalks are plucked for leis and for use in locally manufactured perfume; they also play a role in love magic, and sometimes are introduced as a spice into fish or crab soup. Namoluk I. Marshall 4 (US); "warung;" G.

## SOLANACEAE

*Capsicum frutescens* L.

Planted near people's houses as a condiment food. Several different colors of fruits may be found on varieties growing on Namoluk. The hot peppers are eaten (especially with raw fish) and sometimes are included in leis. Namoluk I. Marshall 5 (US), 8 (US); "mwik."

## SCROPHULARIACEAE

*Bacopa procumbens* (Mill.) Greenm.

Found in the main taro swamp growing in a clump along with *Hedyotis biflora*. The plant has no local uses. Namoluk I. Marshall 104 (US); no local name.

*Lindernia antipoda* (L.) alst.

Growing in the taro swamp; no local uses. Namoluk I. Marshall 82 (US); no local name.

## ACANTHACEAE

*Barleria cristata* L.

Only one specimen of this low bush occurs on the atoll, planted next to a person's house. It was introduced sometime after 1958 from the Truk Agricultural Station on Moen, Truk. Namoluk people have not devised a use for this plant. Namoluk I. Marshall 57 (US); no local name.

## RUBIACEAE

*Guettarda speciosa* L.

Most of these trees grow a few meters above the high water mark in rough, rocky terrain. The long, white, tubelike flowers have an exquisite fragrance and are much sought for leis. The leaves occasionally serve to wrap food for cooking, as disposable plates, and to cover food in an earth oven. "Mosor" wood has a variety of uses, among them: firewood; saplings used in building construction, as poles for poling canoes, for fences and as markers to taboo land or reef sections; formerly, branches were used in fire by friction drills (cf. Girschner 1912:141) and today the wood is used for canoe paddles. Finally, the bark, flowers, and fruit are constituents of herbal medicines. Namoluk I. Marshall 52 (US); "mosor;" G.

*Hedyotis biflora* (L.) Lam?

Specimens were collected both from a shaded area in a path and from the taro swamp. The entire plant has medicinal uses. Its Namoluk name means 'smells like feces'. Namoluk I. Marshall 23, 103 (US); "alou mach."

*Ixora casei* Hance

This lovely bush, festooned with huge pompoms of bright reddish-orange flowers at the tip of each branch, grows plentifully in shady overgrown areas toward the middle of the islets. The supple

branches are bent into rims for the special nets made to capture flying fish; as straight sticks the branches are used by children in a local game called "apis". Occasionally, the flowers are used in leis and the blooming branches may be used for Christmas decor. The stem, bark and flowers are used in medicine. Namoluk I. Marshall 69 (US); "achiou;" G.

*Morinda citrifolia* L.

Grows everywhere from above the high water mark to the edge of the taro excavations; may reach a height of 10 meters. Although the plant is not cultivated, its fruit is eaten regularly. Saplings of "nin" are used in canoe house, cook house and fence construction, are cut as taboo ("pwau") markers for sections of reef, and the wood is a plentiful fuel. When breadfruit seeds are cooked in an earth oven, they are covered with "nin" leaves, and the leaves also are used to wrap eggs for roasting on a fire. The roots of very young "nin" plants formerly were ground up as a substitute for cosmetic tumeric when no tumeric was available. Tumeric was not produced on the atoll and was obtained on trading voyages by sailing canoe from the high islands in Truk Lagoon. Girschner reports that root bark of this plant was an ingredient in locally produced red dye (1912:158). Young branches bearing only a few immature leaves are employed in a kind of magic called "amaras" designed to make a thief admit his guilt and return what he has stolen; the same part of the tree is used in love magic ("auwar") and in a kind of defensive black magic known as "pwelipwel." "Nin" also is used in many medicinal preparations. The fruit is an ingredient in a local cough medicine, the leaves are singed over a fire and rubbed on itchy skin, and the roots of young "nin" plants were peeled and the shavings added to different medicines. In massage ("rewa") treatment for a person who has received a sharp blow (e.g., one who has been hit by a coconut, fallen from a tree or taken a strong punch in a fight), the massage master will manipulate the injured area and forbid the victim to eat roasted food. When the treatment has been completed, the massager will roast a "nin" fruit, slice it thin, and have the injured person and all those who regularly eat with him partake of it as a lifting of the taboo. At least one variety of "nin" growing on Namoluk was imported from Etal Atoll during the 1950s because of its larger fruit (96). Namoluk I. Marshall 2, 96 (US); "nin;" G.

GOODENIACEAE

*Scaevola taccada* (Gaertn.) Roxb. (glabrous form)

These tall shrubs form a standard part of the beach strand vegetation on all the islets. Wood from exceptionally tall plants may be used as poles for poling canoes and in building construction. Smaller branches are cut as markers to taboo sections of reef. The pleasantly fragrant flowers are a regular constituent of leis.

Medicinally, the white ripe berries are squeezed for their juice which is trickled into a person's eyes to relieve the sting of salt water. The flowers and white heartwood also are used in medicine. Namoluk I. Marshall 55 (US); "net;" G.

## COMPOSITAE

*Eclipta alba* (L.) Hassk.

Found growing only in the taro swamps. No local uses. Namoluk I. Marshall 91 (US); no local name.

*Wedelia biflora* (L.) D.C.

This plant is found most frequently near the beach, but it seems to grow all over the islets in relatively cleared areas outside the taro bogs. The leaves serve as mulch for *Colocasia esculenta*, and the entire plant is used in magic to assure that a canoe will not break apart at sea; it also is an ingredient in medicines. Namoluk I. Marshall 33 (US); "etiet;" G.

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Table 1. Information on Pacific currents revealed by messages contained in bottles that drifted to Namoluk Atoll during 1970.

Date dropped	Date found on Namoluk	Total elapsed drift time	Location dropped	Location of Namoluk Atoll	Vessel from which dropped	Person dropping message
24 Nov. 1968	9 May 1970	531 days	Lat. 22° 37' N. Long. 107° 44' W.	Lat. 5° 55' N. Long. 153° 08' E.	Auxiliary ketch yacht Novia del Mar	John P. Scripps Scripps Bldg. San Diego, CA USA 92101
18 Mar. 1969	9 May 1970	417 days	Lat. "crossing equator" Long. 158° W.	Lat. 5° 55' N. Long. 153° 08' E.	S.S. Monterey	Charles E. Karnes 415 W. Newmark Ave. Monterey Park, CA USA 91754
5 Nov. 1969	29 Aug. 1970	297 days	Lat. "crossing equator" Long. 165° 28' W.	Lat. 5° 55' N. Long. 153° 08' E.	S.S. Monterey	F.S. Thompson 4914 Calle Jabali Tucson, AZ USA 85711

Source: Marshall, field research.

Table 2. Monthly Rainfall and Temperature Data for Namoluk Atoll from 1 January 1970 to 31 July 1971.

Month Year	Temperature in degrees Centigrade						Rainfall in millimeters		
	HiHi	LoHi	HiLo	LoLo	AvHi	AvLo	Total rain	Heaviest 24 hr. rain	Days no rain
Jan. 1970	34	28	28	24	31	25.5	275.1	63.2	5
Feb. 1970	35.5	28	28	24	31	26	184.9	49.5	10
Mar. 1970	36	29	28	25	32	27	65.5	18.5	14
April 1970	39	28	28	24	33	26	238.5	48.0	9
May 1970	39	28	27	24	34	25.5	315.5	61.0	1
June 1970	40	30	28	24	35	25.5	282.4	62.2	4
July 1970	41	30	28	24	36	26	231.9	58.9	11
Aug. 1970	39	28	27	23	34	25	509.0	105.4	5
Sept. 1970	39	29	28	23	34	25.5	342.9	129.3	5
Oct. 1970	37	28	27	23	33	25.5	417.6	71.1	5
Nov. 1970	35	27	28	24	32	25.5	332.0	41.1	6
Dec. 1970	39	29	28	23	30	25.5	353.6	41.9	2
Annual 1970	41	27	28	23	33	25.5	3548.9	129.3	77
Jan. 1971	35	27	28	24	32	25.5	406.4	76.2	10
Feb. 1971	35	27	27	24	32	25	406.9	74.9	4
Mar. 1971	38	29	26	22	34	25	312.2	73.7	8
April 1971	37	27	27	24	33	25.5	314.7	71.1	2
May 1971	36	27	27	23	33	25.5	404.6	106.7	2
June 1971	42	27	27	23	35.5	25	343.9	50.8	1
July 1971	39	26	25.5	23	33	24	564.1	85.1	2
7 month 1971 totals	42	26	28	22	33	25.5	2752.8	106.7	29

Source: Marshall, field research.